

CLAIMS

1. A signal detector comprising:

a power input terminal supplied with power voltage from a power supply source;

a power output terminal connected to a device to be measured, and outputting the power voltage inputted from the power input terminal to the device to be measured;

a signal blocking circuit provided on first and second conductive lines connected to the power input terminal, and blocking transmission of a signal between the power input terminal and the power output terminal;

a common-mode signal detection circuit extracting a common mode signal from signals contained in the power voltage between the power output terminal and the signal blocking circuit;

a normal-mode signal detection circuit extracting a normal mode signal from the signals contained in the power voltage between the power output terminal and the signal blocking circuit;

a common-mode signal output terminal provided at an output end of the common-mode signal detection circuit; and

a normal-mode signal output terminal provided at

an output end of the normal-mode signal detection circuit.

2. The signal detector according to claim 1 further comprising:

a first switch provided at an input end of the common-mode signal detection circuit; and

a second switch provided at an input end of the normal-mode signal detection circuit.

3. The signal detector according to claim 2 further comprising:

a mixed-signal output terminal outputting the common mode signal and the normal mode signal contained in the power voltage between the power output terminal and the signal blocking circuit in a mixed condition.

4. The signal detector according to claim 1,
wherein the normal-mode signal detection circuit is configured to include:

a first high-pass filter blocking the power voltage; and

a common-mode signal cancellation circuit removing the common mode signal from signals transmitted through the high-pass filter.

5. The signal detector according to claim 4,
wherein the common-mode signal cancellation circuit is configured to include:

a first mutual-inductance element provided between the first and second conductive lines and generating mutual inductance between the first and second conductive lines;

a detection-inversion circuit provided between the first and second conductive lines, the detection-inversion circuit detecting the common mode signal contained in the power voltage inputted from the power input terminal and inverting a phase of the common mode signal detected; and

an injection circuit injecting an inversion signal into the first mutual-inductance element, a phase of the inversion signal having been inverted by the detection-inversion circuit.

6. The signal detector according to claim 5,

wherein the first mutual-inductance element is configured to include a first winding inserted into the first conductive line, and a second winding inserted into the second conductive line and coupled with the first winding,

the injection circuit is configured to include a third winding coupled with the first mutual-inductance element such that mutual inductance is generated between the third winding and the first mutual-inductance element,

the detection-inversion circuit is configured to include first and second capacitors connected in series between the first and second conductive lines, and

the third winding is connected to a mutual connection point between the first and second capacitors at one end and connected to ground at the other end.

7. The signal detector according to claim 5,

wherein the common-mode signal cancellation circuit further includes a second mutual-inductance element on first and second conductive lines between the detection-inversion circuit and the injection circuit, the second mutual-inductance element acting as an impedance element to the common mode signal.

8. The signal detector according to claim 1,

wherein the common-mode signal detection circuit is configured to include:

a second high-pass filter that transmits only signals; and

a normal-mode signal cancellation circuit that removes the normal mode signal from signals transmitted through the high-pass filter.

9. The signal detector according to claim 8,

wherein the normal-mode signal cancellation circuit is configured to include:

a third mutual-inductance element provided on the

first and second conductive lines and generating mutual inductance between the first and second conductive lines;

a detection-inversion-injection circuit connected to the first conductive line, the detection-inversion-injection circuit detecting the normal mode signal contained in the power voltage on the first conductive line, inverting a phase of the normal mode signal detected and injecting an inversion signal, a phase of which has been inverted, into the first conductive line via the third mutual-inductance element; and

an impedance element provided on the first conductive line between a connection point of the detection-inversion-injection circuit to the first conductive line and the third mutual-inductance element, and reducing a crest value of the normal mode signal.

10. The signal detector according to claim 9,

wherein the third mutual-inductance element is configured to include a fourth winding inserted into the first conductive line, and a fifth winding connected to the second conductive line at one end and mutually coupled with the fourth winding,

the detection-inversion-injection circuit is configured to include a third capacitor connected between the first conductive line and the other end of the fifth

winding, and

the impedance element is configured to include a sixth winding inserted into the first conductive line.